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Introduction: More-than-human participatory research: contexts, challenges, possibilities

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This collection arises from an AHRC funded research project called *In Conversation with....: codesign with more-than-human communities* that ran in 2013, as well as a series of panels held at the RGS-IBG International Conference in 2014 on the *Coproduction of knowledge with non-humans*. In both cases we sought to explore the notion of a ‘more-than-human participatory research’. Yet to say ‘more-than-human participatory research’ seems like too much of a mouthful. These are words that do not roll easily off the tongue, but instead suggest some kind of cacophony, some noisy dissonance. These are words that seem like they should not really sit beside each other, words that do not quite make sense.

Nonetheless, our aim in this collection, which we will explain further below, is precisely to explore the potential of bringing together the growing field of ‘more-than-human research’ (MtHR) with the more established practices of ‘participatory research’ (PR). In bringing these seemingly disparate fields together, we want to point to more entwined histories than initially might seem obvious, and at the same time, to also open up a series of new questions: What might it mean to invite ‘the more-than-human’ to be an active participant, and even partner, in research? How are prevailing ways of conceiving research in terms of issues of knowledge, ethics, consent and anonymity challenged and transformed when we think of the more-than-

human as a partner in research? How might it be possible to transform existing frameworks, practices and approaches to research? What would this transformed research look like?

We first situate more-than-human participatory research (MtH-PR, to help, perhaps, with the cacophony?) within a context of socio-environmental crisis. As we write, the two great conjoined ‘issues’ of shared planetary life – social and ecological injustice (flagged up by the Brandt Report in 1980 and repeatedly after) – seem to be entering new levels of starkness and volatility. These crises are ‘headlined’ by climate change, but also include resource depletion, biodiversity loss, long-term pollutants among others. Attention has also been called to the uneven ways that the consequences of living in this changing world are felt and experienced by specific humans and nonhumans. The vast scale of these changes, which are having profound effects on communities living on land, in the sea and air, have prompted calls for the ‘ecologicalisation’ of knowledge as an essential step in moving away from Enlightenment philosophies of rational, self-aware humans in a machine-like world (Plumwood 2002, Latour and Wiebel 2005, Code 2006, Hinchliffe 2007).

Thus we also situate MtH-PR in the context of widespread experimentation with methods, and related rethinking of methodology, in the social sciences and beyond. We are hearing of inventive methods (Lury and Wakeford 2013), live methods (Back and Puwar 2012), mobile methods (Büscher *et al.* 2010), materialist methods (Pryke *et al.* 2013), creative methods (Gauntlett 2011), mixed methods (Brannen 2005), and methods for working with big data (Savage and Burrows 2007). While this interest in methodological innovation has been linked with new funding contexts, and demands for novelty, as well as calls for greater accounting of research impact, Wiles *et al.* (2013, p. 11) more generously recognise that there are other impetuses for innovation including theoretical, ethical and practical motivations. Our efforts to imagine the possibilities of MtH-PR is thus driven by the need to take environmental devastation

seriously, and to develop research methods that might better support more sustainable ways of living together.

Future directions for more-than-human research methods

At the heart of much of this methodological experimentation is the conviction, which was at the heart of earlier feminist interventions into methods debates (Harding 1986, 1987, Haraway 1988), that methods don't just describe worlds, but make worlds (Law 2004) . That is, they make some things more visible and others more difficult to take into account. As a result, research on aspects of social life that have been absent from dominant research paradigms has brought with it a multitude of critiques of dominant research methods and the search for new methods and new ways of working with traditional ones.

The world of what might be broadly termed more-than-human research (e.g. animal geographies, critical animal studies, ecofeminism, environmental humanities, human-animal studies, multi-species research, new materialism, queer ecologies, science and technology studies [STS], etc.) has been no different. This is, research that has sought – in one way or another – to take nonhuman life and the entanglements of human/nonhuman life, seriously and to thus step away from the modernist dismissal of nature and non-humans as anything but resources. For those working in these and related areas, questioning the methods by which knowledge is created, and science is 'done', is key to shifting away from paradigms of human exceptionalism. As a result, here too we see methods being augmented, hybridised and remade. Examples include ethno-ethnology and ethno-ethology (Lestel *et al.* 2006), multi-species ethnography (Kirksey and Helmreich 2010) as well as those methods adopted for use within zoömusicology (Taylor 2013), animal-computer interaction (Mancini, in this volume) and animal geographies (Wolch and Emel 1998).

Despite, or perhaps because of, the fledgling character of many more-than-human research methods there has already been a number of literature reviews that have sought to trace out the territory and offer suggestions for ways forward. This includes a review of multispecies ethnography (Ogden *et al.* 2013), as well as two reviews of methods within animal geographies (Buller 2014, Hodgetts and Lorimer 2014). In each there is an underlying concern with decentring the human and with taking nonhumans' experiences, perspectives and agencies seriously, in ways that are situated, embodied and non-homogenising. Thus Henry Buller hopes that animal geography will develop approaches that are able to 'suggest or reveal what matters, or what might matter, to animals as subjective selves' (2014, p. 7), while Timothy Hodgetts and Jamie Lorimer emphasise the importance of fulfilling animal geographies' 'promise of taking animals seriously as subjects and ecological agents' (2014, p. 8).

All also emphasise the positive possibilities of working critically with scientific knowledge, technologies and methods as part of achieving these aims. For example, when setting out the future direction of animal geography methods, Buller (2014, p. 7) proposes that a greater engagement with the biological and animal sciences in particular will be needed. For Hodgetts and Lorimer, key suggestions are technologies that enable the monitoring, tracking and analysis of animals spatial movements, experiments with intra- and inter-species communication, and genomic methods that give insights both to 'historic animal mobilities' and 'microbial ecologies within and between animal bodies' (Hodgetts and Lorimer 2014, p. 3). Yet, if the aim is to 'suggest or reveal what matters' to nonhumans, then another contribution to this methodological bricolage might come from a quite different approach, specifically methods developed by colleagues in participatory geographies as well as PR more generally. As an area that is focused on the inclusion of marginalised voices and experiences, the subversion of dominant power structures and has a commitment to co-producing research with those who are affected by it, there appears much to be gained by including it in the conversation.

Potential affinities between MtHR and PR

Questions over the relevance of academic research for broader constituencies have led to increasing interest in PR practices and their overarching aspiration of developing socially responsible and democratic research methods. Such approaches have turned to the co-production of knowledge as a way of transforming the power relations, goal-setting methods and expected outcomes of the research process. Central components of this agenda have been the desire to support the inclusion of marginalised actors and to make research accountable to those it affects. PR has also had a long history of grappling with problems around who is understood ‘to know’ within the research process. Methods have been developed in order to challenge what kinds of knowledges are seen to be legitimate, while also attending to the problems of producing knowledge within contexts of stubborn inequality. The aim has been to decentralise knowledge creation, question the legitimisation of knowledges from ‘experts’ operating outside of research subjects’ subjective experience, through moving towards a distributed democratic, transparent process that also provides a new route for addressing social justice.

Further, while PR methods have been principally concerned with the exclusion of particular human communities, there have been calls from within the area to respond to a further, often unacknowledged, exclusion of the more-than-human. Participatory action researcher Peter Reason (2005), for example, has argued that the more-than-human is the cutting edge problem for PR in the context of the Anthropocene. While participatory economic geographers J.K. Gibson-Graham (2011) and Gerda Roelvink (Gibson-Graham and Roelvink 2010) have called for the extension of work around community economies to more-than-human collectives, arguing for the importance of reframing research as ‘a process of learning involving a collective of human and more-than-human actants — a process of co-transformation that re/constitutes the world’ (ibid., p. 342). Other examples include Kye Askins and Rachel Pain’s exploration of the

role of materiality in PRh and particularly the way that ‘objects as conduits may facilitate transformative social relations to seep across spaces of encounter’ (2011, p. 817, see also Roe and Buser 2016). However, as Isabelle Stengers (2015) argues, one of the great failings of recent political and knowledge cultures was that:

[our generation] thirty years ago, participated in, or impotently witnessed, the failure of the encounter between two movements that could, together, perhaps have created the political intelligence necessary to the development of an efficacious culture of struggle – those who denounced the ravaging of nature and those who combated the exploitation of humans (2015, p. 10).

Ecofeminists did try to do make these connections, insisting on the inseparability of struggles for nature and for social justice, but were roundly critiqued for universalism and essentialism – essentialism being the term used then for making sure that matter was made not to matter (Moore 2015, pp. 216-230). So it is interesting to see some of this work surface in more recent discussions. For instance, Carol Adams’ (1990) work is now more widely being taken up in critical animal studies. Other classic ecofeminist texts such as Susan Griffin’s *Woman and nature: the roaring inside her* (1978) may also acquire new resonances in current times. The epigraph to Griffin’s book, for example, reads: ‘These words are written for those of us whose language is not heard, whose words have been stolen or erased, those robbed of language, who are called voiceless or mute, even the earthworms, even the shellfish and the sponges, for those of us who speak our own language ...’ (1978: v). It could also stand as an epigraph for this collection, particularly in her call for taking seriously the task of listening to and working with the more-than-human.

Even still, the challenges of bringing movements together needs to be acknowledged and Anna Tsing offers one reflection on this in her discussion of collaborations between environmentalists and indigenous peoples. Tsing’s response to those who have understood environmentalists’

interest in indigenous knowledge ‘only as a repetition of environmentalists’ fantasies and imperial histories’ is to lament the persistence of familiar metanarratives ‘in which nothing good can happen – good or bad – but more of the same’ (2005, p. 4). She turns to ‘friction’ to suggest ‘the awkward, unequal, unstable, and creative qualities of interconnections across difference’ (ibid.). We argue that bringing together PR and MtH offers one means of, albeit belatedly, developing such an ‘efficacious culture of struggle’ (Stengers 2015, p. 10), one where frictions appear as generative.

Thus, in proposing a move towards a MtH-PR, we want to recognise these difficulties, while also suggesting that there are a range of intriguing overlaps between the commitments of PR and many MtH approaches. For example, both are interested in developing methods that can reveal what matters to those traditionally excluded from dominant knowledge making processes, as well as fostering techniques that challenge hierarchies in the hope of ‘creating with’ in ways that are ethical, socially just and epistemologically open. As a result, we would argue that an engagement with the various debates that have taken place within PR offer a rich opportunity for those working with nonhuman others to reflect on their methodologies in complex and sophisticated ways. Further, PR may also benefit given moves towards a more explicit recognition of the participation of the more-than-human in collaborative research.

Diverging Coproductions

A further example that at first glance seems to suggest important affinities between MtHR and PR is hinted at via scattered references throughout Buller’s review, in particular, but also in Ogden *et al.* That is the use of terms such as ‘participatory’ (Buller 2014, p. 4), ‘co-creation’ (Buller 2014, p. 6), ‘co-production’ (Buller 2014, p. 6) and ‘coproductionist framework’ (Ogden *et al.* 2013, p. 12). However, as became evident in the process of developing this collection, bringing together PR and MtH frameworks highlighted a more general need to pay explicit

attention to the different histories of the term ‘co-production’ arising from each research area. That is, for MtH researchers (particularly those working within or inspired by STS) co-production seems to most often refer to the more general idea that human and nonhuman agents are intertwined in shared worlds, with both involved in the ‘production’ of these worlds. This approach emphasises a questioning of nature/culture divides and the disciplinary divides based on them. For PR, however, co-production more often focuses attention on efforts to subvert the divide between researcher and researched, in order to move from research *on* to research *with*. That is, while in the former, co-production offers an analytical framework for approaching the object of study, in the latter, co-production is a method of engaging with fellow enquirers.

A helpful way of demonstrating this distinction (which is, of course, broad brush as most such distinctions are), is through a comparison of the ways that coproduction is used and defined in the work of STS theorist Sheila Jasanoff (2004) and political scientist Elinor Ostrom (1996). As discussed by Jenny Atchison and Lesley Head in this volume, Jasanoff uses the term co-production to emphasise the need to think the natural and the social together (2004, p. 4). Her emphasis is on how knowledge of the natural and the social is produced, and particularly the claim that scientific (and technological knowledge) ‘is not a transcendent mirror of reality. It both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions — in short, in all the building blocks of what we term the social’ (Jasanoff 2004, p. 3). She further describes co-production explicitly as ‘an interpretive framework’ (2004, p. 6).

This emphasis on co-production as an analytical tool is important because, by contrast, for Ostrom co-production is better understood as a ‘process’ (1996, p. 1073). The targets of critique, for her and her colleagues, were theories of public governance that supported widespread centralisation of services (1996, p. 1079). They argued, instead, that ‘the production of a service,

as contrasted to a good, was difficult without the active participation of those supposedly receiving the service' (ibid.). Importantly, this participation is directly set against 'citizen "participation" in petitioning others to provide goods for them' (1996, p. 1083), with the scare quotes suggesting an emphasis on a more active engagement in the process. Further, the more general empowerment of participants in the process is also valued, with reports 'that local activism through coproduction rapidly spills over to other areas' used to suggest added benefits of the approach (ibid.). In this case then, co-production is more closely linked with active processes of engaging with, and empowering, those involved.

One needs to be cautious then, when, suggesting that the use of terms such as participation, co-production and co-creation might suggest an inclination towards the possibility of a MtH-PR. That is, given the different understandings set out here, and the confusions we experienced when we framed this project as more-than-human coproduction (as we did at the RGS-IBG in 2014), we want to insist on the specificity of PR accounts of participation and coproduction. These accounts acknowledge that the world is 'co-shaped' by multiple actors. However, they provide a specific emphasis on the processes by which these actors can become actively engaged in research that develops responses to specific issues they are facing. Further we want to insist that the provocation of this collection is to explore this latter account of coproduction. That is, could MtH commitments to understanding 'what matters' to nonhumans support even more challenging methodological experiments, particularly around who research is done for and with?

As a result, whilst there has been a steady growth in work that recognises the agency of non-humans in knowledge production, something different characterises the contributions to this edited collection and that is an interest in how one might invite specific non-humans into the research process at the outset, rather than identifying non-human agency in human social worlds as a research output. This collection builds on the wide range of work that challenges the

Western heritage of machine-like understandings of animal non-humans (or inert-matter for non-animal non-humans) by exploring what the next steps might be in terms of academic research practices. To date, PR and MtH trajectories have not yet been brought into explicit conversation; however, each appears to have much to learn from the other. This collection thus presents research from a wide range of disciplines, regions and methodological approaches that grapples with the problem of how to revise, reshape and invent methods in order to work with non-humans in participatory ways. The challenges are considerable, and yet interest in this area is intensifying. This collection therefore offers an initial framework for thinking critically about the promises and potentialities of participation from within a more-than-human paradigm, and opens up trajectories for its future development.

The revenant of Anthropomorphism

Before discussing the individual contributions, we want to address the (almost inevitable) question of what role anthropomorphism might play in this venture. As may be familiar to our readers, many of those who work in the broad area of MtHR can end up repeatedly having to argue for the possibility of relationships between humans and nonhumans that go beyond the purely instrumental, or to respond to generalised critiques that they are anthropomorphising (i.e. critiques made, not in relation to the specifics of the work, but simply because someone is talking about nonhuman agencies). Indeed the situation reminds us of similar situations that arise within feminist research where there can be pressure to return to foundational questions such as whether there is indeed any problem with sexism anymore. Within feminism there has been a recognition that this demand can hinder feminist work by taking energy away from developing and deepening feminist theory because basic assumptions are having to be proven and reproven. We see the possibility of an analogous problem arising within MtHR. As a result, we were keen that this collection built on previous work to push questions of MtHR and any potential interrelations with PR further, rather than revisited an issue that has been tackled directly elsewhere. Thus

while we will address responses to anthropomorphism here, this is in part to free up our contributors from the obligation so that they can explore the specifics of their case studies in relation to the collection's frame of MtH-PR. This is not to say that there is no need to be careful of bias, inappropriate assumptions or projection, but to suggest that these are problems that all research methods are developed to grapple with, even those focused on humans.

So one response to anxieties about anthropocentrism is to point to the huge amount of research that has shown that nonhumans are capable of a much wider range of cognitive, emotional and symbolic behaviours than they have traditionally been given credit for in Western cultures. Wolves and dogs have senses of fairness and justice (Beckoff 2007), parrots call each other by name (Berg 2011), octopuses use tools (Finn 2009), and mimosa plants can learn to distinguish between types of threats (Gagliano 2014). As Bastian points out in her chapter in this volume, PR has long been wary of claims of deficits in ability and instead emphasises methodological flexibility and experimentation in order to find ways of including all those affected by an issue. The growing awareness of the wide range of capacities that non-humans enjoy, suggests that a MtH-PR could find ways of working with these capacities, rather than assuming from the outset that such research was an impossibility.

Another response is to reject the premise that is fundamental to generalised accusations of anthropomorphism, namely human exceptionalism. As philosopher Val Plumwood (2007) has argued, in her blistering critique of Raymond Gaita's (2002) *The Philosopher's Dog*, the belief in a hyperseparation between humans and nonhuman animals leads to untested assumptions of radical discontinuities, and a lack of curiosity about evidence that might prove the contrary. For Plumwood, the real problem is not anthropocentrism, but with 'the way assumptions of human superiority and mind discontinuity structure our concepts and limit our perceptions of animal behaviour' (2007 n.p.). This scepticism over the ability of nonhumans to have any mindful or

communicative capacities, is not, she further argues, ‘purely an empirical or observational matter, but is always already an action of exchange or refusal of exchange, a matter of stance and performativity (in the sense of Wittgenstein and Austin), a matter of listening and invitation’ (ibid). Plumwood highlights the political nature of this performative scepticism through comparison with cases where other humans have been thought to be without ‘proper’ reflective capacities such as slavery and colonialism (ibid). Attention might also be given to how the dominant figure of the *anthropos* continues to illustrate the ‘inability of Western knowledges to conceive their own processes of (material) production, processes that simultaneously rely on and disavow the role of the body’ (Grosz 1993, p.187). In contrast then, a range of theorists have suggested other terms that might be more useful in drawing attention to inappropriate assumptions about nonhumans including Eileen Crist’s (1999) ‘mechanomorphism’ (the assumption that animals are like machines) and Daniel Dennett’s (cited in Pollan 2013) ‘cerebrocentrism’ (the assumption that only a biological brain can support intelligence). Or following Grosz, to take seriously the corporeality of the human body, as a basis for relating to and sharing experiences with nonhumans, for example suffering (Haraway 2008).

Of course we are not claiming that therefore PR with nonhumans would be straightforward and unproblematic. PR rests in large part on careful, systematic, ethical listening, conversations, non-specialist languages, trying to establish non- hierarchical power relations, conducting research in conducive settings and material arrangements. To do all those with nonhumans, of one stripe or another, raises a whole suite of conceptual, ethical, and practical challenges. We would suggest however that keeping in mind the very small amount of scientific research on the full capacities of specific non-humans, as well as the general prejudices within heritages of Western thought,ⁱ that there is a lot of room to be curious about how these challenges might be met.

What we aren’t saying

We also thought it important to clarify what we *don't* think this collection is doing. That is, our aim is not to set out an already developed set of methods for MtH-PR. While we do include examples of researchers actively wrestling with the possibility, there is still much work to be done. Thus our collection is motivated by what we see as a highly promising potential for more-than-human researchers and participatory researchers (who are not always different people), to explore how their shared concerns with including those who have been excluded in particular ways from research processes, might speak to each other. These explorations may very well create challenges to, just as much as new ways of supporting, each other's ways of working. Thus, we seek to contribute to broader methodological discussions occurring in these areas, such as around the theoretical questions underpinning the choice of particular methods, such as who these methods include/exclude, where they do and don't work, what kinds of ethical/relational considerations they raise, what are the frictions and affordances, and how they might be imagined otherwise.

The step between recognising the agential capacities of specific nonhumans, to then developing methods that might enable their active participation in research processes is a significant threshold, one that this current collection identifies and seeks to begin to cross. Articulating and unpacking some of the difficulties that might be encountered is thus a key contribution. Given the range of non-human others we share the planet with (and who are present in this book), as well as the fledgling nature of this field, we do not seek to propose a systematic, or unified approach, but rather to introduce readers to a range of work unfolding in this area and a set of interconnecting themes and questions.

The question of what the limits of a MtH-PR might be are also a live issue throughout the chapters (see particularly 10-12). For example, could specific non-humans ever 'fully participate' in a research project, particularly when we consider the PR ideal of participants

being able to actively shape research questions, the processes of data gathering and analysis, and dissemination strategies? Here we would note, however, that the question of full participation is still a live one within PR with humans,ⁱⁱ and so we have no expectation that such questions will be easily answered. However we do believe that they should indeed be asked in relation to research with nonhumans, as part of responding to the ethical framework underlying PR, namely that those affected by research should be involved in it. So, while the aim of the book is to showcase work developing in this area, it is inevitable that as many questions will be raised as answered. No more so than in the specifics of how exactly such participation might occur and in what ways. As such the wide range of case studies enables the collection to offer insights into what these specifics might eventually look like in relation to different non-human partners and contexts.

What we *are* hoping to do is to support a more explicit dialogue between PR and MtHR via the provocations suggested in this collection. We see strong resonances between the more-than-human and participatory paradigms, but we are not claiming to know in advance how the dialogue between them would play out. Instead the collection aims to take both as seriously as possible and to explore the affordances and frictions. Where do analogies offer new insights and where do they break down? We by no means assume that one can be laid over the other, but rather that the perspectives of each might allow the other to be seen in a different light (see for example Bastian's discussion of diffraction, in this volume). For us, MtH-PR arguably goes beyond providing a new context for research (Wiles *et al.* 2013), and the demands of trying to take the more-than-human seriously as a research participant call for a significant transformation in research methodology.

The book is divided into three sections. The first ‘Experiments in more-than-human participatory research’, the second ‘Building (tentative) affinities’ and the third ‘Cautions’. These relate to how the chapters make different forms of critical engagements with doing MtH-PR.

Review of chapters

The first section ‘Experiments in more-than-human participatory research’ includes chapters that make the boldest moves for putting MtH-PR into practice. In the opening chapter of the collection, Michelle Bastian describes and analyses a one year exploratory project that speculated about the possibilities of working with animals, insects, plants and the elements, as research partners. She proposes reading PR and MtHR through a diffractive lens to see what light each might shed on the other. Drawing on a recent review of PR, as well as critiques such as Bill Cooke and Uma Kothari’s (2001), Bastian suggests a number of ways that the approaches and insights developed within PR might usefully point the way towards a more-than-human PR. She also shows how MtH approaches might encourage a reconsideration of particular aspects of PR. This includes issues such as a closer attention to the ways humans are shaped by the nonhumans in their lifeworlds, whether PR approaches might help foreground and question power relationships between humans and nonhumans, how they also might help to challenge assumptions of competency, and encourage methodological exploration in order to support wider inclusions. However, the chapter also emphasises the dangers of assuming that participation is a simple good, and also explores issues of overlooking wider inequalities, the danger of pseudo-participation and the lack of wider contexts that might support working with nonhumans in these ways.

The focus of Hollis Taylor’s chapter is birdsong, specifically Australian pied butcherbirds, and her groundbreaking work in zoömusicology. Arguing against the dominant approach of

biologists studying a small amount of songbird species in captivity, Taylor outlines a participatory ethnographic approach that works with free-living birds and which is led by musicologists. She reflects on her own practices by bringing them into conversation with participatory approaches, such as those particular to music including jazz and music therapy. Drawing on a variety of PR accounts, Taylor explores the problems of differences in skills and abilities, being both an insider and an outsider, how to ascertain if birds have given her permission to run the project with them, and coproducing research outcomes. She concludes by issuing a challenge to human exceptionalism within music and arguing instead for attending to nuance, individual capacities and the creativity of nonhuman songsters.

From music, we then turn to technology with Chapter Three including a selection of work from computer interaction designer Clara Mancini. In the first section, Mancini draws on the user-centred approach of Human-Computer Interaction (HCI) to offer an initial manifesto for an Animal-Computer Interaction (ACI) that designs technology with and for the nonhumans that are expected to work with it. Examples include in agriculture (where cows might interact with robotic milking machines) and in scientific research (where animals might be tagged and tracked with a variety of devices). She asks how might the animal perspective inform the design of these and other technologies, partly to mitigate risks of unsuitable designs, but more broadly in order to develop a research agenda around interspecies computer interaction. The second selection bring us to more recent work in ACI which sets out an ethical framework for the approach. Here we focus particularly on Mancini's recommendations around animal welfare and animal consent in research processes, as key areas for consideration within a future more-than-human PR. In particular Mancini argues that it in their specific role as users and participants that an ethical treatment of nonhuman animals should be considered.

Peter Reason's chapter takes us to the question of the 'participatory mind' and particularly how it might support a 'deep participation' with the more-than-human world. Working in the form of nature writing (arguably a genealogical progenitor of MtH-PR), Reason narrates a sailing journey off the northwest coast of Scotland. He focuses our attention on the temporality of pilgrimage in geological landscapes, and the intertwinings of clock-time, Earth time, the eternal present and deep time. Playfully remaking the action research cycles of action and reflection within the experience of pilgrimage, Reason's contribution emphasises the role of writing forms in sharing participatory encounters more widely.

The second section 'Building (tentative) affinities' includes chapters that examine practices of learning to engage with animals, plants or water as research participants. Inviting another set of participatory literatures to the conversation, Timothy Hodgetts and his spaniel Hester, take us into the world of wildlife conservation. In this chapter they share some of the ways they have learned to work together as part of a conservation team helping to spot traces of endangered pine martens. Attunement is suggested as a key issue for MtH-PR, particularly the ways that indexical communicative signs might be translated across species. They also raise questions about the levels of participation available to both human and dog within the endeavour, the uneven power between them, and who counts within the larger conservation project. Finally, issues emphasised in PR literatures, namely ethical issues of consent, mutual benefit and recognition, are refracted through their experiences to highlight the difficulties of straightforwardly reading their activities, or participatory wildlife conservation more generally, as a potential form of MtH-PR.

The theme of apprenticeship continues in Hannah Pitt's contribution, but with the potential challenges extended by considering the possibilities of learning from plants. Building on her previous work on more-than-human methods, Pitt suggests that research conducted through processes of learning (e.g. via participatory action research, communities of practice, and/or

apprenticeship), rather than through demonstrations of expertise, offers room for a greater recognition of ‘planty knowledge’. The importance of nonverbal communication and active material engagement within apprenticeship, suggest it as a method that might support learning from plants through watching, growing, accepting feedback and trying other routes. Pitt emphasises, however, the otherness of plants and particularly that which must always remain elusive and obscure. While she notes this as a common problem with human PR, this elusiveness would appear to frustrate the future-looking aspects of PR which aim for shared visions of better worlds. She concludes by emphasising a range of ‘tricky’ problems that any MtH-PR with plants would face, including the difficulties of agreeing goals, aims and who is to be empowered in the process.

For Reiko Goto Collins and Timothy Martin Collins, moving to an understanding of plants as beings of value requires finding ways of supporting imagination and empathy. Their chapter describes their project ‘Eden3: Plein Air’, a sculptural instrument that a tree ‘plays’. Temporality becomes an important issue here too, with the common assumption that trees are relatively still and passive in part resting on their different paces of growth and change. As part of counteracting these assumptions Goto-Collins and Collins’ project hones in on the processes of transpiration and photosynthesis which occur on a day to day level and can feel more similar to human time. Their chapter shares the difficult iterative process involved in working across art, science, technology and sound design in order to support an empathic relationship with a tree. They conclude by asking whether hearing the tree, its ‘breath’, might encourage a wider sense of ethical duty beyond the human. Here a MtH-PR is fundamentally about active listening and aiming to make a positive difference.

The collection’s exploration of human interrelationships with plants continues in Anna Krzywoszynska’s account of empowerment, skill and the creation of new subjectivities. She

draws on her more-than-human ethnography of organic wine making to explore how each of these aspects of PR operate when read through the process of learning to care for vines. The importance of the relational self for empowerment is itself shown to be shaped by the affective states that enabled Krzywoszynska to move toward an active relationship with the vines she learned to prune. Enchantment, becoming and focus were all central to this skill acquisition. This analysis is then returned to PR debates on empowerment to show how a more-than-human perspective can offer further ways of understanding the process of cultivating new ways of being in the world.

The question of ‘giving voice’ is one that arises throughout this collection, and is a particular focus in Jon Pigott and Antony Lyons’ contribution. Here the more-than-human participants include bats, the water in a river catchment, sensor technologies, and data. Pigott and Lyons describe the development, and theoretical implications, of their eco-art project *Shadows and Undercurrents*. With a primary interest in highlighting the hidden processes contributing to the loss of biodiversity, the project involved an 18 month ‘slow-art residency’ that culminated in an immersive installation space which included data-activated kinetic sculptures. Attunement, empathy and affect play alongside tools of measurement and the production of data-streams to produce an experience of ‘intimate science’. Rather than seeking to facilitate the participation of more-than-humans from the outset, Pigott and Lyons reflect on the ways that their participation became more pronounced through the iterative development of the project. They conclude by focusing on water in particular, and speculating on ways that it may, and may not, be engaged with in participatory ways.

The final three chapters of the book, found within the third section ‘Cautions’, continue many of the themes raised throughout the collection, but also help to bring a particular focus on the potential limits of a MtH-PR. The role of empathy in developing greater recognition of

nonhuman agency is emphasised in a number of contributions in this collection, as well as in MtHR more widely. In Eva Giraud and Gregory Hollin's chapter, however, the instrumentalisation of empathy is shown to be a key tool in the efficient handling of laboratory dogs, specifically beagles. Analysing documents arising from the experimental beagle colony at University of California, Davis, Giraud and Hollin show that care-taking practices and affective human-animal relations do not always generate the sense of ethical responsibility that MtHRers might hope it does. Here the differentiation between the two approaches to coproduction, discussed above, become of key importance. That is, while there is clear evidence that beagles coproduced research at Davis in the STS sense, any processes of coproduction, in the PR sense, were fundamentally undermined. Giraud and Hollin thus suggest that the complexities of resistance and consent need to be thoroughly engaged with, and particular attention paid to the ways violence can be intertwined with care.

Jennifer Atchison and Lesley Head's contribution reflects on their previous ethnobotanical research and emphasises the difficulties of considering plants as collaborators. The entanglements that they have studied between humans and plants demonstrate the possibilities of mutual flourishing, but also of brutally adversarial relationships, such as those with invasive plants. They also suggest that attending to any concerns that plants might have is not often seen to be a relevant or urgent task for researchers. Even if a MtH-PR were to be attempted with plants, the human framing of PR, the lack of knowledge of plant capacities, the need to attend to the specificities of particular plants, as well as the significant methodological innovation that would be required, all suggest reasons to be anxious and cautious about the endeavour. Tracing their work with yams, wheat and rubber vines, as well as the people entwined with them, Atchison and Head argue for more humble recognition of plants' diverse capacities and ways of being.

Deirdre Heddon's contribution concludes the collection by offering a critical response to the *In conversation with...* project discussed in Chapter One. Utilising a performative writing style, Heddon argues for closer attention to the importance of listening to *both* humans and nonhumans in any MtH-PR. Drawing on philosopher Jean-Luc Nancy's work, amongst others, Heddon reworks listening as concern, curiosity and anxiety. Introducing participatory forms of theatre-making she proposes a form of co-authorship and collaboration that focuses on what can be made *with* others, through openness and acceptance, rather than traditional forms of academic scholarship that focus in individual demonstrations of expertise. She asks both how might we avoid 'compelling the other to talk' and hearing only what we already know?

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ⁱ See also Kim Tallbear's (2011) argument about the ways these heritages continue to affect MtHR with the exclusion by some of nonliving nonhumans from accounts of agency.

ⁱⁱ See for example Cooke and Uma Kothari(2001), and the debates that followed the publication of this collection.